Cingular Wireless LLC
Report on Implementation of Wireless E911 Phase II ALI
November 9, 2000

Pursuant to requirements of section 20.18(h) of the Commission's rules[1] and the Wireless Telecommunications Bureau's Public Notice released September 14, 2000,[2] Cingular Wireless LLC, on behalf of its subsidiaries and affiliates ("Cingular Wireless"), respectfully submits the following information to the Wireless Telecommunications Bureau ("WTB") concerning Cingular Wireless's plans for implementation of wireless Enhanced 911 ("E911") Phase II Automatic Location Identification ("ALI") systems.

(Please note that for each numbered section of this report WTB's specific inquiry is italicized and Cingular Wireless's response is in regular typeface.)

Background/Contact Information

(1) *Carrier Identifying Information*: Cingular Wireless LLC, TRS # (See Attachment A).

(2) *Contact Information*: Andrew W. Clegg, Senior Manager of Strategic Technology, BellSouth Cellular Corp., 1100 Peachtree St., NE, Suite 803, Atlanta, GA 30309, 404-249-3267 (voice), 404-249-5157 (fax), andrew.clegg@bellsouth.com (e-mail); and Robert J. Tyler, Regional Manager of Network Technology Development, SBC Wireless, 2000 West Ameritech Center Drive, 3F53D, Hoffman Estates, IL 60195, 847-765-6533 (voice), 847-765-3707 (fax), robert.j.tyler@cellular.ameritech.com (e-mail).

E911 Phase II Location Technology Information

(1) Type of Technology: Identification of the Phase II location technology(ies) that the carrier plans to deploy across its service territory, e.g,, network-only, handset-only, hybrid or a combination thereof. Please also include a complete description of the technology(ies) that is/are chosen and the name of the corresponding vendor or vendors. Indicate what technology will be used in each individual area of the carrier's service territory.

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[1] *See In the Matter of Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, CC Docket No. 94-102, *Third Report and Order*, 14 FCC Rcd. 17388, 17426-28 (1999), *as modified in Fourth Memorandum Opinion and Order*, FCC 00-326, rel. Sept. 8, 2000, at ¶¶ 75-81.

[2] *See* "Wireless Telecommunications Bureau Provides Guidance on Carrier Reports on Implementation of Wireless E911 Phase II Automatic Location Identifications," CC Docket No. 94-102, Public Notice DA 00-2099, rel. Sept. 14, 2000.

(a) PCS1900 (GSM) Markets: Cingular Wireless plans to deploy a handset (GPS) technology in the markets in which it provides PCS1900 service. These broadband PCS markets are identified by the Commission as: MTA002 (Los Angeles-San Diego), MTA004 (San Francisco-Oakland-San Jose), MTA006 (Charlotte-Greensboro-Greenville-Raleigh), MTA024 (Seattle), MTA044 (Knoxville), BTA026 (Augusta, GA), BTA058 (Brunswick, GA), BTA 228 (Kennewick-Pasco-Richland, WA), BTA 250 (Lewiston-Moscow, ID), BTA 425 (Spokane, WA), BTA 460 (Walla Walla, WA-Pendleton, OR), BTA410 (Savannah, GA) and BTA482 (Yakima, WA). Cingular Wireless is currently in the process of evaluating vendors' network infrastructure and handsets that incorporate network assisted GPS functionality in PCS 1900 handsets.

(b) TDMA/AMPS Markets: Cingular Wireless plans to deploy a network-based technology for its analog and IS-136 service areas, which include all of its coverage areas not specified in (1)(a). Cingular Wireless plans to deploy a combination of network based technologies, including cell site and sector information, Time Difference of Arrival ("TDOA"), Angle of Arrival ("AOA"), and/or multipath RF mapping. BellSouth Cellular Corp., an indirect wholly owned subsidiary of BellSouth Corporation, issued a Request for Quote to several vendors of network-based technology. Cingular Wireless is now evaluating the responses that were received as of the end of August 2000. Cingular Wireless expects to choose a vendor or vendors by the first quarter of 2001.

(2) Testing and Verification: A description of the testing method used, or to be used, to determine the accuracy of the ALI solution(s) selected, and a description of the results of tests already conducted.

(a) Testing Method to be Used: To determine compliance with FCC Phase II accuracy mandates, Cingular Wireless has used, and expects to continue to use, testing methods based upon those described in OET Bulletin 71.

(b) Results of Tests Already Conducted: Cingular Wireless has conducted tests of the currently available location-technologies under consideration (E-OTD, AOA, TDOA, Network Assisted GPS, and RF Mapping). The tests were conducted during various stages of technology development and in virtually all RF environments (urban, suburban, rural, outdoors, indoor, etc.). The data obtained in each specific trial of location-technology is subject to nondisclosure agreements (NDAs) with the respective vendors and, therefore, cannot be disclosed publicly. However, a general summary of the trial results is provided here:

(i) The testing methodology for previous trials was created prior to the issuance of OET Bulletin 71, but generally adhered to the methodologies described in that document. Test points were established at random locations

(subject to physical access) and compared to measurements obtained with professionally-surveyed GPS, differential GPS, and handheld consumer GPS receivers. Professionally-surveyed reference points made up approximately 5% of the reference locations, and their coordinates were known to an accuracy of better than one meter. Differential GPS points were known to an accuracy of approximately one to five meters. Handheld GPS measurements were accurate to within approximately five to thirty-five meters (corresponding to selective availability off and on, respectively).

(ii) None of the location-technologies strictly met the relevant FCC accuracy mandate (network or handset) in all environments. In the last six months, Cingular Wireless's trials have shown a substantial improvement in the accuracy performance of most technologies. In general, the overall 67% and 95% accuracies now achieved are typically 50% worse than the mandate. For example, the accuracy of network-based technologies was typically one hundred fifty meters 67% of the time across a composite of environments, as compared to the one hundred meters accuracy required by the E911 rules. It should be noted, however, that these figures represent an extremely simplified summary of numerous tests that cannot be disclosed individually.

(iii) Many of the technologies were able to meet or exceed the accuracy requirements in suburban outdoor (or in-vehicle) environments where, according to the record in the E911 Phase II proceeding, the majority of wireless 911 calls originate. The toughest environments for all technologies included office buildings, train stations, parking garages, and underneath bridges.

(iv) Some of the technologies showed promise of improvement and possible eventual compliance with the FCC accuracy mandate, given sufficient time for further development and calibration.

(3) *Implementation Details and Schedules: A complete description of the carrier's strategy and schedule for the installation of the hardware and software needed to implement its chosen technology (handset-based, network-based or hybrid systems). For example, indicate whether both hardware and software changes will be necessary and fully describe the precise nature of the changes. In addition, please provide the roll-out schedule for the installation of the ALI technology(ies).*

(a) TDMA/AMPS Markets: Although the exact nature of the hardware installations will depend on the vendor chosen to provide location technology, and the specific solution(s) deployed at a given site, network-based equipment will likely require measurement units at each base station. For example, additional antennas will be required at base stations in areas (such as rural) that require AOA techniques for accurate locations. Other than the additional antennas for AOA, the hardware will typically consist of a short rack of equipment that must be connected to power,

antenna, and communications (DS0) ports, and located in a weather-proof enclosure. The direction-finding antennas for AOA installations will be installed upon towers or roof-tops co-located with or in the vicinity of the antennas used for regular cellular coverage.

Additional equipment is required in the cellular network to process requests for locations and to perform the actual position calculations. The equipment will typically be installed in central locations such as mobile switching centers.

The amount of time required to install the equipment is not known with certainty, as no large-scale deployment has occurred. Vendors have estimated that two to four base stations could be upgraded per day per team of installers, and the centralized equipment should be installed in less than one week's time. For a typical medium-sized market consisting of two hundred cell sites, installation time will be, at best, ten to twelve weeks. This estimate does not include the "learning curve" for installing and operating the equipment, time required to resolve zoning issues, and/or additional time spent on especially difficult or remote installations. In addition, calibration of the network-based location system could take a substantial amount of time (several weeks based upon current experience), and will be an on-going process.

On the infrastructure side, upgrades to base station controller software will be required to make the RF and network systems compliant with location-technology standards. The software updates are performed by the infrastructure vendors, who have informed us that the new software will be available prior to October 1, 2001.

(b) GSM Markets: Network assisted GPS deployment will be principally governed by the availability of GSM handsets supporting network assisted GPS. The network component required to support GPS is primarily centralized equipment used to process the handset-based GPS measurements and to monitor network performance. The network component will be installed in centralized locations such as mobile switching centers ("MSCs"). Reference receivers will also need to be deployed in the network. As in our TDMA markets, software enhancements will be needed throughout the network to support the required signaling of location related information. At least one of our infrastructure vendors (Nortel) has informed us and the FCC that it cannot complete all software upgrades in time for the October 1, 2001, deadline if a very large number of PSAP requests occur in 2001.

Cingular Wireless plans to be compliant with the FCC schedule for handset deployment, contingent upon the availability of handsets from the manufacturers.

(c) Roll-out Schedules: Deployment schedules for Phase II technology will be dictated by PSAP requests.

(4) *PSAP Interface: A description of hardware and software changes necessary to transmit Phase II data to PSAPs and the carrier's strategy and schedule for the installation and/or modification of such hardware or software changes.*

Cingular Wireless plans on deploying a Non-Call Associated Signaling network technology utilizing the newly defined network entity called a Mobile Position Center ("MPC"). The functionality of the MPC is defined in TIA/EIA J-STD-036, "Enhanced Wireless 9-1-1 Phase 2," a standard jointly developed by the communications industry and public safety. Per J-STD-036, the MPC provides the point of interface between a wireless carrier and the public safety network and serves as the network entity that retrieves, forwards, stores and controls position data within the location network.

Cingular Wireless is in the process of selecting an MPC supplier. Vendors are currently in the product development stage. At least one vendor has indicated that a commercial, J-STD-036 compliant MPC will be available in mid-2001. Test platforms may be available sooner.

Cingular Wireless intends to install and begin testing MPC functionality as soon as vendors are able to provide a standards compliant platform. Fully testing MPC functionality, however, requires that ALI service providers upgrade the interface to the ALI systems to support J-STD-036. As this is accomplished, Cingular Wireless will begin testing end-to-end transmission of Phase II data with ALI service providers.

Software upgrades will be required to support MPC functionality in the MSC. Cingular Wireless's MSC vendors have indicated that upgrades for the various switches will be available on time scales ranging from 4Q2000 to 4Q2001.

After verification testing of compliant versions of MSC software, Cingular Wireless plans to work with MSC suppliers to schedule and carry out MSC upgrades.

(5) *Existing Handsets: A description of the carrier's strategy and schedule for the upgrade and/or replacement of existing customer handsets, if applicable.*

For TDMA/AMPS systems, Cingular Wireless plans to deploy a network-based solution or solutions that does/do not require changes to the handsets. Legacy handsets are covered under this deployment plan.

For handsets which support network assisted GPS, which are required in our GSM networks, Cingular Wireless plans to be compliant with the FCC schedule contingent upon handset availability.

(6) *Location of Non-Compatible Handsets: A description of the best efforts that carriers employing a handset-based or hybrid system will take to accommodate handsets that are incompatible with the carrier's ALI system, e.g., handsets that do not have ALI capability, or handsets that are ALI-capable, but are not compatible with the carrier's particular handset-based or hybrid system.*

In Cingular Wireless's TDMA/AMPS markets, the issue of non-compatible handsets is not relevant because the network-based location equipment is capable of locating all handsets, including legacy handsets.

In GSM markets where network assisted GPS technology will be used, Cingular Wireless plans to provide, at a minimum, Phase I location information for legacy handsets. Additionally, Cingular Wireless plans to evaluate software systems that can use timing advance, cell ID, and RF signal strength to provide an approximate location of non-compliant handsets to a level of accuracy that is better than Phase I location information.

(7) *Other Information: Please provide any other information, including a description and history of any Phase II requests received from PSAPs, that will assist the Commission and affected parties in monitoring and coordinating the deployment of E911 Phase II in accordance with the timetables set forth in the Commission's rules.*

A Phase II E911 location system is an extremely complex technology that has never been fully deployed on any large-scale commercial wireless network anywhere in the world. Cingular Wireless believes that a full-scale, end-to-end Phase II deployment will encounter many obstacles and challenges that have not been—and cannot be—foreseen. For this reason, Cingular Wireless is studying the feasibility of deploying a full-scale, end-to-end Phase II system (not a trial or a demo) in one of its markets prior to the FCC-mandated deadlines. The purpose of this first office application (FOA) would be to fully understand the complexities of Phase II installation and operation, so that the subsequent system installations will proceed with greater efficiency. If the Phase II FOA is deployed, Cingular Wireless plans to share experience gained with the FCC, cellular and PCS operators, location technology vendors, GIS vendors, and PSAPs.

ATTACHMENT A

Cingular Wireless LLC was created, pursuant to Commission authorization,[1] by the combination of the mobile wireless voice and data businesses previously operated by subsidiaries of BellSouth Corporation and SBC Communications Inc. The most recently published information on those entities and their unique TRS Identification Numbers is set forth below.[2] In some instances, as a result of the creation of Cingular Wireless LLC, and associated corporate reorganizations and disposition of assets, certain entities listed below may have changed corporate forms, *e.g.*, from a corporation to a limited liability corporation, and certain entities may no longer exist. Nevertheless, any such changes were approved by Commission action or the Commission was informed of such changes as permitted by its policies concerning pro forma reorganizations.

BellSouth Corporation

TRS ID	**Name of Carrier**
804330	Acadiana Cellular General Partnership
804258	Alabama Cellular Service, Inc.
804286	American Cellular Communications Corp.
811426	Anniston-Westel Company, Inc.
804285	Atlanta-Athens MSA Ltd. Partnership
818584	BCTC of Texas, Inc.
815048	BellSouth Carolinas PCS, L.P.
804261	BellSouth Mobility, Inc.
815046	BellSouth Personal Communications, Inc.
804354	Bloomington Cellular Telephone Co.
804306	Chattanooga MSA Ltd. Partnership
804312	Decatur RSA Ltd. Partnership
804264	Florida Cellular Service, Inc.
804315	Florida RSA No. 2B (Indian River) Ltd. Partnership
804318	Georgia RSA No. 1 Ltd. Partnership
804321	Georgia RSA No. 2 Ltd. Partnership
804324	Georgia RSA No. 3 Ltd. Partnership
804279	Huntsville MSA Ltd. Partnership
804287	Indiana Cellular Corporation

[1] *See In re Applications of SBC Communications, Inc. and BellSouth Corporation*, File Nos. 0000117778, *et al.*, WT Docket No. 00-81, *Memorandum Opinion and Order*, DA 00-2223, rel. Sept. 29. 2000.

[2] *See* "Carrier Locator: Interstate Service Providers January 2000," at 131-132 (SBC Communications Inc.) and 271-272 (BellSouth Corporation), file LOCAT99.PDF found at <http://www.fcc.gov/Bureau/Common_Carrier/Reports/FCC-State_Link/LOCTOR/LOCAT99.PDF>.

ATTACHMENT A (cont'd)

BellSouth Corporation (cont'd)

TRS ID	Name of Carrier
804297	Jacksonville MSA Ltd. Partnership
804270	Kentucky CGSA, Inc.
804288	Lafayette MSA Ltd. Partnership
804273	Louisiana CGSA, Inc.
804333	Louisiana RSA No. 7 Cellular General Partnership
817420	Louisiana RSA No. 8 Limited Partnership
804344	MCTA
804294	Memphis SMSA Ltd. Partnership
804343	M-T Cellular, Inc.
804351	Muncie Cellular Telephone Co., Inc.
804259	Northeast Mississippi Cellular, Inc.
804327	Northeastern Georgia RSA Ltd. Partnership
818256	Orlando CGSA
804300	Orlando SMSA Ltd. Partnership
804340	Tennessee RSA Limited Partnership
804348	Terre Haute Cellular Telephone Co., Inc.
804345	Westel-Indianapolis Company
804360	Westel-Milwaukee Company, Inc.

SBC Communications, Inc.

TRS ID	Name of Carrier
803221	Ameritech Communications International, Inc.
808735	Ameritech Mobile Services, Inc.
809115	Ameritech Wireless Communications, Inc.
809096	Chicago SMSA Limited Partnership
809104	Cincinnati SMSA Limited Partnership
809110	Cybertel Cellular Telephone Company
809114	Cybertel Corporation
809112	Cybertel RSA Cellular, L.P.
809102	Detroit SMSA Limited Partnership
803214	Illinois Bell Telephone Company
809100	Illinois RSA 6&7 Limited Partnership
809098	Illinois SMSA Limited Partnership
803217	Indiana Bell Telephone Company, Inc.
809108	Madison SMSA Limited Partnership
803220	Michigan Bell Telephone Company
809106	Milwaukee SMSA Limited Partnership

ATTACHMENT A (cont'd)

SBC Communications, Inc. (cont'd)

TRS ID	Name of Carrier
804483	Nevada Bell
801963	Pacific Bell
806323	Pacific Bell Mobile Systems
803664	SNET America, Inc.
803391	SNET Cellular, Inc.
803388	SNET Mobility, Inc.
811710	Southwestern Bell Communications Services – Illinois, Inc.
811713	Southwestern Bell Communications Services – Maryland, Inc.
811711	Southwestern Bell Communications Services – Massachusetts, Inc.
811712	Southwestern Bell Communications Services – New York, Inc.
811709	Southwestern Bell Communications Services, Inc.
804480	Southwestern Bell Mobile Systems, Inc.
805767	Southwestern Bell Telephone Company
805769	Southwestern Bell Wireless Inc.
803394	Springwich Cellular Limited Partnership
803223	The Ohio Bell Telephone Company
804489	The Southern New England Telephone Company
803226	Wisconsin Bell, Inc.